



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,193	08/22/2005	Caiguo Gong	2002B093	5600
23455	7590	12/01/2008		
EXXONMOBIL CHEMICAL COMPANY			EXAMINER	
5200 BAYWAY DRIVE				WYROZEBSKI LEE, KATARZYNA I
P.O. BOX 2149			ART UNIT	PAPER NUMBER
BAYTOWN, TX 77522-2149			1796	
			MAIL DATE	DELIVERY MODE
			12/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,193	GONG ET AL.	
	Examiner	Art Unit	
	Katarzyna Wyrozebski	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 04 September 2008.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) See Continuation Sheet is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1,2,5,8,10,11,13,16,19,20,22,23,27,29,30,32,34-37,39,42,45 and 72-76 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. _____.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/17/2008.

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) Notice of Informal Patent Application

6) Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 1,2,5,8,10,11,13,16,19,20,22,23,27,29,30,32,34-37,39,42,45 and 72-76.

In view of applicant's amendment and response dated 6/6/2008 following office action is rendered final as necessitated by amendment. Applicant's amendment incorporated new limitations, which are not supported by the specification. Claims 1, 2, 5, 8, 10, 11, 13, 16, 19, 20, 22, 23, 27, 29, 30, 32, 34-37, 39, 42, 45, 72-76 are pending. The amendment also required search to provide for new art, as well as ODP rejection.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 2, 5, 8, 10, 11, 13, 16, 19, 20, 22, 23, 27, 29, 30, 32, 34-37, 39, 42, 45, 72-76 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The applicants have amended the claims to recite limitations of:

"...styrenic derived units in amount of 1 to 15 wt%...", and

"...some of the styrenic derived units are functionalized..."

The independent claims reciting the new limitations are not supported in the specification. Page 6 and 7 of the specification discloses that the amount of styrene in the

polymer is 3-20 wt %, 5-12 wt %, 5-15 wt % most preferably 8-13 wt %. The applicants have no support for styrene content lower than 3 wt %.

Second limitation that is not described or supported in the specification is term "some".

The applicants have no explanation as to the meaning of the term "some". Page 5 of the specification lists functional groups suitable for functionalization of styrene. Page 7 of the specification further excludes halogenation. Reading further the specification, halogenation is reserved for secondary rubber, which is not the rubber utilized in intercalation.

Extent of functionalization – can only be found in the examples and it refers to specific types of rubber and specific amounts of styrene based compound. The functionalized compound is *p*-methylstyrene 11.5 wt % in comparative example 1, examples of the instant invention. Therefore even though the applicants list many groups suitable for functionalization of the styrene component, only 11.5 wt % of PMS is supported.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 10, 22 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 recites term "styrenic units" and "the styrenic derived units". Latter lacks antecedent basis.

Claim 10 and 32 is further indefinite. Independent claims recite the amount of styrene units or styrene derived units to be in amount 1-15 wt %. The claims also indicate that the elastomer comprises also, *p*-methyl styrene, which would mean that the *p*-methyl styrene is in addition to the styrenic species of independent claims. It is not clear if the amount disclosed in independent claims is the same amount as disclosed in claims 10 and 32, especially when styrene monomer (unfunctionalized form) is also enabled. If the amount disclosed in independent claims is the amount of only functionalized styrene monomer, then claims 10 and 32 fail to narrow the limitations of independent claims, and claims 1 and 22 have to be re-written to reflect functionalized styrene content.

Claim Objections

5. Claim 2, 30 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Specifically, independent claims already recite presence of functionalized groups.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1, 2, 5, 8, 10, 11, 13, 16, 19, 20, 22, 23, 27, 29, 30, 32, 34-37, 39, 42, 45, 72-76 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-45 of copending Application No. 11/293561 ('561). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following explanation.

Co-pending application '561 discloses clay nanocomposite, comprising halogenated rubber and clay. Halogenated butyl rubber comprises *p*-methyl styrene and brominated derivative thereof, which is functionalized with polar group. Polar groups are disclosed in

dependant claims of co-pending application and they encompass polar groups of the instant invention.

Clay component of co-pending application is smectite type clay capable of intercalation and exfoliation. The clay is also pre-treated with ammonium compound to render it organophilic. The clay is then intercalated with elastomer comprising polar group disclosed therein.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1, 2, 5, 8, 10, 13, 16, 19, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over USUKI (EP 1,029,823) and CHINO (US 6,372,855).

USUKI discloses rubber composition comprising clay intercalated with rubber comprising polar groups.

Clay of USUKI is smectite type clay such as montmorillonite, mica [0144, 0166], basically the usual smectite type clay capable of cationic exchange, swelling, intercalation and eventual exfoliation into single clay platelets.

Clay is pretreated with ammonium compounds, to render clay organophilic and thereby compatible with polymeric intercalant [0104].

The ammonium treated clay of USUKI is intercalated by rubber (including butyl rubber) [0109] comprising polar group. The polar groups are listed in Table I of USUKI on page 5. Table includes anhydride group. The process of intercalation of clay is described in [0093] and it reads on the process described in the instant invention.

Nanocomposite rubber of USUKI was compounded with matrix rubber and formed into vulcanized article having increased permeability [0213-217]. The components compounded with clay nanocomposite included carbon black, zinc oxide, sulfur vulcanizing agent, accelerator and matrix rubber. Matrix rubber also includes butyl rubber, polybutadiene and the like (see examples).

Increased permeability is much desired property for vulcanized elastomeric articles such as tire inner liners or inner tubes, for they inhibit permeation of air to the outside.

The difference between the present invention and the teachings of USUKI is more specific description of butyl rubber, i.e., styrene content and its use in tire industry.

Example I-3 of CHINO discloses use of Exxpro 90-10 butyl rubber, which rubber comprises *p*-methyl styrene and brominated derivative thereof. The rubber is a trademark of ExxonMobil and it comprises 92.5 % of isobutylene, 7.5 % of *p*-methyl styrene. The styrene content of the rubber of CHINO therefore satisfies applicant's new limitation.

The rubber of CHINO is also modified with functional groups. According to teachings of CHINO rubber is functionalized by compound having polar group, which includes imide and

anhydride structures. Examples include maleic anhydride and maleimide. The prior art of CHINO and USUKI have therefore coming modifying agent, which is maleic anhydride.

The composition of CHINO or modified rubber of CHINO is utilized in rubber compositions for tires (see col. 1, line 63). Composition for tire parts of CHINO include carbon black and/or silica, coupling agents, curatives or crosslinking agents and the like (col. 6-7).

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art to utilize the intercalating rubber of CHINO in the composition of USUKI for following reasons:

Both disclosures are in the same field of endeavor, which is rubber composition. Both disclosure modify butyl rubber in order to increase compatibility between components of the composition. Since the butyl rubber of CHINO has the same or similar polar group (anhydride) it will by virtue have the same effect on the compatibility of the rubber composition with organoclays. As a result and tire inner liner having decreased permeability will be obtained.

10. Claims 72-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over USUKI (EP 1,029,823) and CHINO (US 6,372,855) as applied to claims 1, 2, 5, 8, 10, 13, 16, 19, 20 above, and further in view of ADJABANI (US 6,759,464)

The discussion of USUKI and CHINO from paragraph 9 of this office action is incorporated here by reference.

The difference between the present invention and the teachings of USUKI and CHINO is recitation of other polar groups.

The prior art of ADJABANI discloses composition comprising clay nanocomposite, wherein the rubber is modified with polar group so that it is more compatible with organoclay. The specific recitations of polar groups suitable for use in the teachings of ADJABANI include acids and their equivalent anhydrides (col. 10). Examples include itaconic acid and anhydride; citraconic acid and anhydride; maleic acid and anhydride; and the like. These compounds are functional equivalent of each other, since all three contain two carboxylate groups and one oxygen in between, which functionalities are capable of the same interaction or reaction with clay, wherein clay is an organoclay (montmorillonite pretreated with ammonium compound).

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize polar groups of ADJABANI in the teachings of USUKI and CHINO and thereby obtain the claimed invention.

Anhydrides of ADJABANI are shown to be functional equivalent of the compounds disclosed in USUKI and CHINOM especially when USUKI teaches maleic anhydride, such that they are capable of improving compatibility of polymeric matrix with nanoclay.

11. Claims 22, 23, 27, 29, 30, 32, 34-37, 39, 42, 45, 72-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over USUKI (EP 1,029,823) and CHINO (US 6,372,855) as applied to claims 1, 2, 5, 8, 10, 13, 16, 19, 20 above, and further in view of NANNI (US 2004/0102557, designated state US)

The discussion of USUKI and CHINO from paragraph 9 of this office action is incorporated here by reference.

The difference between the present invention and the teachings of USUKI and CHINO is recitation of peroxides.

The prior art of NANNI discloses elastomeric composition comprising clay and polar group. The polar groups contain carboxylate groups incorporated *via* carboxylic acids or anhydrides. Anhydrides are disclosed in [0048] and include maleic anhydride or itaconic anhydride. These compounds are grafted onto the rubber with peroxide.

Peroxides of NANNI are listed in [0039] and include hydrogen peroxide, peracetic acid, perbenzoic acid and the like. Others include benzoyl peroxide or dicumyl peroxide [0048], wherein the latter one is for grafting not crosslinking.

Grafting using peroxide is well known method in the art, which method provides olefin polymer with polar group.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art to utilize peroxide as a grafting agent in order to modify olefinic monomer with polar anhydrides. Using such methods will provide polymer such as that of USUKI and CHINO, especially when NANNI teaches using anhydrides to modify olefinic polymers.

In view of applicant's amendment and newly applied rejections applicant's arguments are considered moot.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna Wyrozebski whose telephone number is (571) 272-1127. The examiner can normally be reached on Mon-Thurs 8:30 AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katarzyna Wyrozebski/
Primary Examiner, Art Unit 1796
November 24, 2008